

REMARKS

Claims 1-80 are pending in the above-captioned patent application after this amendment. Claims 7, 14, 15, 22, 27, 34-36, 38-47, 54, 56, and 72-76 were found to contain patentable subject matter. Claims 1-6, 8-13, 16-21, 23-26, 28-33, 37, 48-53, 55, and 57-71 have been rejected. The drawings filed on April 25, 2003 were accepted by the Examiner. The Examiner further objected that there are two "claim 33" in the Preliminary Amendment that accompanied the Request for Continued Examination, and that correction action is required.

The Applicants respectfully disagree with the rejection of claims 1-6, 8-13, 16-21, 23-26, 28-33, 37, 48-53, 55, and 57-71. However, the Applicants have amended claims 20, 21, 34, 35, 51-53, 58, 61, 66 and 76, and added new claims 77-80 for the purpose of expediting the patent application process in a manner consistent with the goals of the Patent Office pursuant to 65 Fed. Reg. 54603 (September 8, 2000), and/or to clarify what the Applicants regard as the present invention. Claims 20, 21, 34, 35, 51-53, 58, 61, 66 and 76 have been amended solely to correct certain informalities and not to overcome any specific stated rejections.

Support for the amendments to claims 20, 21, 34, 35, 51-53, 58, 61, 66 and 76 can be found throughout the originally filed application, including the originally filed claims, the drawings and the specification. More specifically, support for the amendments to claims 20, 21, 34, 35, 51-53, 58, 61, 66 and 76 can be found at least in the specification at page 19, line 17 through page 20, line 19, in Figures 1 and 3, and in the previously filed claims.

Support for new claims 77-80 can be found throughout the originally filed application, including the originally filed claims, the drawings and the specification. More specifically, support for new claims 77-80 can be found at least in the specification at page 13, line 12 through page 14, line 4, at page 17, lines 23-32, at page 21, line 11 through page 22, line 15, in Figures 1 and 3, and in the previously filed claims.

No new matter is believed to have been added by this amendment.

Reconsideration of the pending application is respectfully requested in view of the above-recited amendments and the arguments set forth below.

Claim Objections

The Examiner has objected to the presence of two "claim 33" contained within the Preliminary Amendment that accompanied the Request for Continued Examination filed on April 25, 2003. In response, the Applicants have eliminated the second occurrence of "claim 33" as provided in the Preliminary Amendment, as the second occurrence was accidentally included when the Preliminary Amendment was filed. The second occurrence of "claim 33" is essentially an exact duplicate of the first "claim 33", except for a minor typographical error that was present in the second occurrence of "claim 33".

Rejections Under 35 U.S.C. § 102(e)

Claims 1-6, 8-9, 16-18, 32-33, 40, 48-50, 57-64, and 69-71 are rejected under 35 U.S.C. § 102(e) as being anticipated by Ebihara et al. (U.S. Patent No. 6,323,935). The Applicants respectfully traverse the rejection of claims 1-6, 8-9, 16-18, 32-33, 40, 48-50, 57-64, and 69-71, and respectfully submit that claims 1-6, 8-9, 16-18, 32-33, 40, 48-50, 57-64, and 69-71 are patentable over Ebihara et al.

More particularly, the Examiner contends that, "(w)ith respect to claims 1-6, 8-9, 16-21, 29-33, 40, 48-52, 57-64, and 69-71, Ebihara discloses an stage device (10)/and corresponding method comprising all of the basic structures as set forth in the instant claims such as: a base structure (12) that retains the stage (14); a X driving system (22)/X mover connected to the stage and moving the stage along in the X direction; a Y driving system/Y mover (60,70) for driving the stage along the Y direction; a measurement system (15) for monitoring the stage, the measurement system having a first X system (50X1) for providing a first X position signal and indicating the position of the stage along the X direction when the stage is in the first position; and a second X system (50X2) for providing a second X position signal and indicating the position of the stage along the X direction when the stage is in the second position; and Y axis interferometer (50Y) for detecting position information of the device table along the Y direction; and a control system (16) for receiving the position signals from the measurement system and directing the appropriate drive signals for moving the stage as desired (see fig. 1-2, and col. 9, lines 45-58)."

The Examiner further asserts that "Ebihara further teaches a direct servo or indirect

servo control system (see col. 13, lines 62 through col. 14) for controlling the stage mover assembly wherein one servo cycle lasts between 0.1 to 1.0mm (see col. 17, lines 5-7 and 33-40) and the stage is moved at constant velocity in the X axis direction 'while switching from the first X system to the second X system' (see col. 21, lines 6-7); and 'controlling the position information IFY, IFX1, IFX2 every 1 millisecond from each of the interferometers' which can be regarded as 'a predetermined number of servo cycles in the transition region', as claimed."

The Applicants respectfully note the inconsistency concerning which claims the Examiner intended to reject as being anticipated by Ebihara et al. under 35 U.S.C. §102(e), where claims 19-21, 29-31, 51 and 52 were not mentioned generally initially, but were mentioned subsequently specifically. Because claims 19-21, 29-31, 51 and 52 are rejected by the Examiner additionally under 35 U.S.C. §103(a), the Applicants believe that the Examiner mistakenly mentioned claims 19-21, 29-31, 51 and 52 as rejected under 35 U.S.C. §102(e). However, the Applicants respectfully submit that claims 19-21, 29-31, 51 and 52 are also patentable over Ebihara et al.

The Applicants provide that Ebihara et al. is directed to a positioning apparatus 10 comprising a base structure 12, a reticle stage 14 suspended above the base structure 12, a driving assembly 22 supported above the base structure 12 for driving the reticle stage 14 in the X direction and small yaw rotation, a laser interferometer system 15, a position sensor 13, and a position control system 16. Two rectangular blocks 90A and 90B are fixed on a main stage body 42 to receive the driving force in the Y direction from a second electromagnetic actuator 70 which is mounted on a carrier/follower 60. The carrier/follower 60 and the electromagnetic actuator 70 are provided to control the reticle stage 14 in the Y direction. An appropriate drive signal of actuator 70 produces small displacements of the reticle stage 14 in the Y direction, and as the position of the reticle stage 14 changes, a drive signal is sent to the carrier/follower 60 causing it to follow the reticle stage 14.

The reticle stage 14 includes the stage body 42 on which the reticle 44 is positioned, with a plurality of interferometer mirrors 50 provided on the main body 42 of the reticle stage 14 for operation with the laser interferometer system 15 for determining the exact position of the reticle stage 14. A laser beam LBY is incident on the reflecting

surface of the interferometer mirror 50Y, a laser beam LBX1 from the X1-axis interferometer is incident and reflected on the interferometer mirror 50X1, and a laser beam LBX2 from the X2-axis interferometer is incident and reflected on the interferometer mirror 50X2. The positioning of the reticle stage 14 is accomplished utilizing the laser interferometer system 15 as drive signals are sent for driving the reticle stage 14 in the X direction. A difference in the resulting drive to opposite sides of the reticle stage 14 will produce a small yaw rotation of the reticle stage 14, which will in turn produce a difference between the measured values from laser beams LBX1 and LBX2.

The position of the reticle stage 14 is fed to the position control system 16 in order to direct the appropriate drive signals for moving the reticle stage 14 as desired. The positioning sensor 13 includes capacitance gap sensors 13A, 13B to detect the change in the gap in the X direction between the blocks 90A, 90B and the actuator 70. The difference between the measured gap values is obtained by either digital or analog operation, and a direct servo (feedback) or indirect servo control system which controls the driving current for the carrier/follower so that the carrier/follower 60 will automatically perform a follow-up movement in the X direction always keeping a certain space to the stage body 42. The control system 16 controls the motion of the reticle stage 14 by reading the position information IFY, IFX1, IFX2 every 1 millisecond from each of the interferometers. (Ebihara et al. column 8, line 50 through column 9, line 4, column 9, lines 46-58, column 10, lines 36-67, column 11, lines 18-22, column 11, lines 64-66, column 13, line 40 through column 14, line 8, column 15, line 66 through column 17, line 18, and in Figures 1-3, 4B and 6).

However, Ebihara et al. does not disclose a control system that switches from the first X system (LBX1, 50X1, IFX1) to the second X system (LBX2, 50X2, IFX2) within a predetermined number of servo cycles in a transition region. Further, Ebihara et al. does not disclose the control system not directing current to the X mover during a predetermined number of servo cycles when the device table is in a transition region. The control system in Ebihara et al. receives position information IFY, IFX1, IFX2 from each of the interferometers every 1 millisecond and then directs current to the various movers to move to the reticle stage as desired. The control system in Ebihara et al. is not designed to switch between position signals during any number of servo cycles.

Additionally, Ebihara et al. does not disclose a control system that switches between Y systems within a predetermined number of servo cycles. In fact, Ebihara et al. discloses only one Y system (LBY, 50Y, IFY) for monitoring the position of the reticle stage 14 in the Y direction.

In distinction to Ebihara et al., claim 1 of the present application recites "(a) stage assembly ... comprising: a device table that retains the device; a X mover connected to the device table and moving the device table along the X axis; a measurement system that monitors the position of the device table, the measurement system including a first X system that provides a first X position signal that indicates the position of the device table along the X axis when the device table is in the first region and a second X system that provides a second X position signal that indicates the position of the device table along the X axis when the device table is in second region; and a control system connected to the X mover and the measurement system, the control system receiving the X position signals from the X systems and directs current to the X mover to move the device table along the X axis from the first region to the second region with a plurality of servo cycles, wherein the control system switches from the first X system to the second X system within a predetermined number of servo cycles in the transition region."

Ebihara et al. does not teach or disclose the elements of claim 1 as is required to substantiate a §102(e) rejection. Accordingly, the Applicants respectfully submit that claim 1 is patentable over Ebihara et al. Because claims 2-6, 8, 9 and 16-18 depend directly or indirectly on claim 1, they are likewise patentably distinguishable over Ebihara et al.

Further, in distinction to Ebihara et al., claim 19 of the present invention recites "(a) stage assembly ... comprising: a device table that retains the device; an X mover connected to the device table and moving the device table along the X axis; a Y mover connected to the device table and moving the device table along the Y axis; a measurement system that monitors the position of the device table, the measurement system including a first X system that provides a first X position signal that indicates the position of the device table along the X axis when the device table is in the first region and the transition region, a second X system that provides a second X position signal that indicates the position of the device table along the X axis when the device table is

in second region and the transition region, a first Y system that provides a first Y position signal that indicates the position of the device table along the Y axis when the device table is in the first region and a second Y system that provides a second Y position signal that indicates the position of the device table along the Y axis when the device table is in second region; and a control system connected to the X mover, the Y mover, and the measurement system, the control system receiving the position signals from the systems and directs current to the movers to move the device table along the X axis and along the Y axis from the first region to the second region with a plurality of servo cycles, wherein the control system switches from the first X system to the second X system within a predetermined number of servo cycles when the device table is in the transition region."

Ebihara et al. does not teach or disclose the elements of claim 19 as is required to substantiate a §102(e) rejection. Accordingly, the Applicants respectfully submit that claim 19 is patentable over Ebihara et al. Because claims 20, 21 and 29-31 depend directly or indirectly on claim 19, they are likewise patentably distinguishable over Ebihara et al.

Additionally, in distinction to Ebihara et al., claim 32 of the present invention recites "(a) stage assembly ... comprising: a device table that retains the device; a X mover connected to the device table and moving the device table along the X axis; a measurement system that monitors the position of the device table, the measurement system including a first X system that provides a first X position signal that indicates the position of the device table along the X axis when the device table is in the first region and a second X system that provides a second X position signal that indicates the position of the device table along the X axis when the device table is in second region; and a control system connected to the X mover and the measurement system, the control system receiving the X position signals from the X systems and directs current to the X mover to move the device table along the X axis from the first region to the second region with a plurality of servo cycles, wherein the control system does not direct current to the X mover during a predetermined number of servo cycles when the device table is in the transition region."

Ebihara et al. does not teach or disclose the elements of claim 32 as is required to substantiate a §102(e) rejection. Accordingly, the Applicants respectfully submit that claim

32 is patentable over Ebihara et al. Because claims 33, 40 and 48-50 depend directly or indirectly on claim 32, they are likewise patentably distinguishable over Ebihara et al.

Still further, in distinction to Ebihara et al., claim 51 of the present invention recites "(a) stage assembly ... comprising: a device table that retains the device; a Y mover connected to the device table and moving the device table along the Y axis; a measurement system that monitors the position of the device table, the measurement system including a first Y system that provides a first Y position signal that indicates the position of the device table along the Y axis when the device table is in the first region, a second Y system that provides a second Y position signal that indicates the position of the device table along the Y axis when the device table is in the second region and a third Y system that provides a third Y position signal when the device table is in the first region, the second region and the transition region; and a control system connected to the Y mover and the measurement system, the control system receiving the position signals from the Y systems and directing current to the Y mover to move the device table along the Y axis from the first region to the second region with a plurality of servo cycles, wherein the control system switches from the first Y system to the third Y system within a predetermined number of servo cycles when the device table is in the first region."

Ebihara et al. does not teach or disclose the elements of claim 51 as is required to substantiate a §102(e) rejection. Accordingly, the Applicants respectfully submit that claim 51 is patentable over Ebihara et al. Because claims 57-59 depend directly or indirectly on claim 51, they are likewise patentably distinguishable over Ebihara et al.

Yet further, in distinction to Ebihara et al., claim 60 of the present invention recites "(a) method for making a stage assembly ... comprising the steps of: providing a device table that retains the device; connecting an X mover to the device table, the X mover moving the device table along the X axis; providing a measurement system, the measurement system including a first X system that provides a first X position signal that indicates the position of the device table along the X axis when the device table is in the first region and a second X system that provides a second X position signal that indicates the position of the device table along the X axis when the device table is in second region; and connecting a control system to the X mover and the measurement

system, wherein the control system switches between the X systems during a predetermined number of servo cycles when the device table is in the transition region."

Ebihara et al. does not teach or disclose the elements of claim 60 as is required to substantiate a §102(e) rejection. Accordingly, the Applicants respectfully submit that claim 60 is patentable over Ebihara et al. Because claims 61-64 and 69-71 depend directly or indirectly on claim 60, they are likewise patentably distinguishable over Ebihara et al.

Rejections Under 35 U.S.C. § 103(a)

Claims 9-13, 19-22, 23-26, 28-31, 51-53, 55, 57-59 and 65-71 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Ebihara et al. (U.S. Patent No. 6,323,935) in view of Makinouchi et al. (U.S. Patent No. 6,259,511). Ebihara et al., as noted above, has been cited as prior art under 35 U.S.C. §102(e). The Applicants respectfully traverse the §103(a) rejection of claims 9-13, 19-22, 23-26, 28-31, 51-53, 55, 57-59 and 65-71, based on 35 U.S.C. §103(c), which provides as follows:

"(c) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person." 35 U.S.C. §103(c). (Emphasis added).

Evidence to Establish Common Ownership

The claimed invention included in the present application and Ebihara et al. were, at the time the invention in the present application was made, owned by and/or subject to an assignment to Nikon Corporation. Thus, Ebihara et al. is disqualified as prior art in a rejection under 35 U.S.C. §103(a). (See MPEP 706.02(I)(2)).

Because sufficient evidence has been provided to establish "common ownership" of the present invention and Ebihara et al., the rejection of claims 9-13, 19-22, 23-26, 28-31, 51-53, 55, 57-59 and 65-71 under 35 U.S.C. §103(a) has been overcome and should be withdrawn. Accordingly, claims 9-13, 19-22, 23-26, 28-31, 51-53, 55, 57-59 and 65-71 are believed to be allowable.

Allowable Subject Matter

Claims 7, 14, 15, 22, 27, 34-36, 38-47, 54, 56 and 72-76 are found to contain allowable subject matter, but are objected to as being dependent upon a rejected base claim. Claims 7, 14, 15, 22, 27, 34-36, 38-47, 54, 56 and 72-76 depend either directly or indirectly upon one of claims 1, 19, 32, 51 or 60, which, as argued above, are believed to be patentable. Accordingly, the Applicant respectfully submits that claims 7, 14, 15, 22, 27, 34-36, 38-47, 54, 56 and 72-76 are not dependent upon rejected base claims. Therefore, the Applicants respectfully submit that claims 7, 14, 15, 22, 27, 34-36, 38-47, 54, 56 and 72-76 are patentable.

New Claims

New claims 77-80 have been added with this amendment. New claims 77-80 are of a slightly different scope than the previously pending claims. However, new claims 77-80 are believed to be patentable in view of the cited references.

New claims 77 and 78 depend directly from claim 1, which, as stated above, is believed to be patentable. Accordingly, new claims 77 and 78 are also believed to be patentable over the cited references.

New claim 79 depends directly from claim 32, which, as stated above, is believed to be patentable. Accordingly, new claim 79 is also believed to be patentable over the cited references.

New claim 80 depends directly from claim 60, which, as stated above, is believed to be patentable. Accordingly, new claim 80 is also believed to be patentable over the cited references.

Remaining References

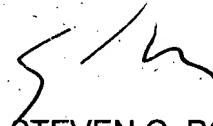
The references cited by the Examiner, but not relied on for the rejection of claims, have been noted. The remaining references are no more pertinent than the applied references, therefore, a detailed discussion of these remaining references is deemed unnecessary for a full and complete response to the Office Action.

Conclusion

In conclusion, the Applicants respectfully assert that claims 1-80 are patentable for the reasons set forth above, and that the application is now in a condition for allowance. Accordingly, an early notice of allowance is respectfully requested. The Examiner is requested to call the undersigned at 858-456-1951 for any reason that would advance the instant application to issue.

Dated this the 18th day of November, 2003.

Respectfully submitted,



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